

rain and thunderstorms from the Missouri Valley to the middle Atlantic and New England coasts. From the 7th to 10th low area VI produced precipitation from the Missouri Valley to the north Atlantic coast, and on the 10th snow was reported as far south as the mountains of northern Virginia. Under the influence of low areas VII, VIII, IX, and X rain fell from the Pacific coast to the upper Lakes from the 10th to 19th, and snow was reported during this period in locations from the northern Plateau region to Michigan. From the 22d to 25th low area XIV caused heavy rains in the Southeastern States, and at Jacksonville, Fla., 12.86 inches of rain fell during the seventy-two hours ending at 8 a. m., of the 25th. Low area XV, that appeared over Arizona on the 22d and reached the middle Atlantic coast the night of the 27th, was attended by rain generally east of the Rocky Mountains. During the closing days of the month practically all sections of the country were visited by occasional rains.

Coast and Lake ports were advised regarding storms that threatened to inconvenience or damage shipping.

BOSTON FORECAST DISTRICT.

The chief weather feature of the month was the storm of the 27th to 29th, during which general and heavy rain fell throughout New England; at several points in central and southern New England the rainfall was between four and five inches. Freshets were caused in rivers and streams and in many sections lowlands were flooded. The storm was attended by high winds on the southern New England coast, but no damage to shipping has been reported. Thunderstorms were more frequent than usual and in a number of instances were severe, buildings being struck by lightning and burned and a number of persons injured. Frosts occurred frequently and at a later date than usual. Frost warnings were issued to cranberry growers on the 10th and 29th. During the night of the 10-11th the temperature in the bogs ranged from 25° to 28° and killing frosts occurred. Frosts, less severe, were noted on several other dates.—*J. W. Smith, District Forecaster.*

NEW ORLEANS FORECAST DISTRICT.

The month was abnormally dry over the southern portion of the west Gulf States. No general disturbance occurred and no special warnings were issued.—*I. M. Cline, District Forecaster.*

CHICAGO FORECAST DISTRICT.

No storms of unusual severity occurred in the North-Central States. Warnings were, however, issued in advance of several well-defined storms, and as no casualties were reported it is probable that they were of great service. Frost warnings were issued on several dates and were verified. Special warnings for the cranberry marshes of Wisconsin were also in every case verified, and were important for the reason that the owners were enabled to flood the marshes in anticipation of frost.—*H. J. Cox, Professor and District Forecaster.*

LOUISVILLE FORECAST DISTRICT.

With the exception of cool periods from the 6th to 10th, and on the 20th-21st and 28th the temperature in Kentucky and Tennessee was abnormally high. Frost warnings were issued for Kentucky on the morning of the 6th and for Kentucky and Tennessee on the mornings of the 7th and 9th, all of which were verified. During the first five or six days thunderstorms occurred, after which a period of dry weather continued practically until the 25th. From the 25th until the 28th copious showers fell in both States, and on the 31st thunderstorms, with excessive rains, occurred, and damaging wind squalls visited a large portion of Kentucky.—*F. J. Walz, District Forecaster.*

DENVER FORECAST DISTRICT.

May presented no unusual weather features. Temperature was below the normal, except in eastern Colorado; heavy frost

was confined to the high stations, and the damage by frost at lower altitudes was slight. No special warnings were issued or needed. Precipitation was in excess in southwestern Wyoming, western Colorado, Utah, and southern New Mexico, and a corresponding deficiency was noted east of the mountains and in northern portions of New Mexico and Arizona.—*F. H. Brandenburg, District Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.

The noteworthy features of the month were unusually heavy rains during the last week, with surface winds in California from the south and southwest, essentially rain-bearing winds, and rainfall at San Francisco heavier for the season than at any time since 1884.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND, OREG., FORECAST DISTRICT.

May was unusually stormy. The principal disturbance made its appearance off the Washington coast the morning of the 25th, and storm warnings were immediately ordered at all seaports. The following night a maximum wind velocity of 68 miles occurred at North Head, Wash., and high winds were reported in the Puget Sound country. This disturbance moved slowly eastward, and, besides the high winds detrimental to navigation, it caused a rainy period of several days that, on the whole, was very beneficial to agricultural interests; but along the northern slope of the Blue Mountains the rains were excessive, and much damage was done by floods in the small streams rising in those mountains.

Both the Umatilla and the Walla Walla rivers overflowed their banks and inundated the neighboring lowlands. Many bridges were washed away or seriously weakened, and numerous washouts occurred along the track of the Oregon Railroad and Navigation Company between Meachem and Umatilla. Railway traffic over this stretch of road was entirely suspended for several days. The cities of Pendleton, Oreg., and Walla Walla, Wash., were greatly inconvenienced by floods and some property was damaged, but the losses were not heavy.

Frosts occurred frequently in the intermountain section of the district, for all of which timely warnings were issued.

Although May is the month for high water in the Columbia River, due to the melting of snow in the Rocky Mountains, the river rose very slowly, and at the close of the month it was below the danger stage at all points where observations are taken.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

River conditions were comparatively quiet and uneventful during the month. The crest of the April rise in the lower Mississippi River reached Baton Rouge on the 1st and New Orleans on the 3d, and by the 7th a general fall was in progress. There was a moderate flood in the Arkansas portion of the Red River from the 6th to the 13th, with a maximum stage of 31.2 feet at Fulton, Ark., 3.2 feet above the flood stage. The flood was well forecast by warnings issued on the 3d and 6th, and extended only a short distance below Fulton. A flood of similar character also occurred in the Chickasawhay River of Mississippi about the same time. The warnings, issued a few days in advance, were fully justified, and proved of much value to interests affected by flood waters. Heavy rains during the first ten days of the month over the headwaters of the Rio Grande caused a general rise in that river below the mouth of Rio Chama, for which advices were issued on the 13th. There were additional rains from the 19th to the 21st, inclusive, necessitating advices of a similar character on the 23d. The crest stages were in both instances somewhat below the flood lines.

The highest and lowest water, mean stage, and monthly range at 283 river stations are given in Table VI. Hydrographs for typical points on seven principal rivers are shown

on Chart I. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the

Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—H. C. Frankenfeld, Professor of Meteorology.

CLIMATOLOGICAL SUMMARY.

By Mr. JAMES BERRY, Chief of the Climatological Division.

TEMPERATURE AND PRECIPITATION BY SECTIONS, MAY, 1906.

In the following table are given, for the various sections of the Climatological Service of the Weather Bureau, the average temperature and rainfall, the stations reporting the highest and lowest temperatures with dates of occurrence, the stations reporting greatest and least monthly precipitation, and other data, as indicated by the several headings.

The mean temperatures for each section, the highest and

lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperature and precipitation are based only on records from stations that have ten or more years of observation. Of course the number of such records is smaller than the total number of stations.

Section.	Temperature—in degrees Fahrenheit.								Precipitation—in inches and hundredths.					
	Section average.	Departure from the normal.	Monthly extremes.				Section average.	Departure from the normal.	Greatest monthly.		Least monthly.			
			Station.	Highest.	Date.	Station.			Lowest.	Date.	Station.	Amount.	Station.	Amount.
Alabama.....	69.7	- 2.1	Flomaton.....	97	18	Valley head.....	31	10	4.63	+1.16	Pushmataha.....	9.18	Daphne.....	1.97
Arizona.....	66.5	- 2.3	Roosevelt.....	109	19	Grand Canyon.....	20	12	0.11	-0.13	Williams.....	0.62	16 stations.....	0.00
Arkansas.....	68.8	- 0.8	Lacrosse.....	100	30	Harrison.....	28	9	4.71	-0.17	Russellville.....	10.31	Rogers.....	0.71
California.....	59.8	- 2.7	Manmoth Tank.....	108	8	Bodie.....	14	28	3.19	+1.78	Forlyce Dam.....	12.46	8 stations.....	0.00
Colorado.....	51.9	0.0	Holly.....	99	16	Tamarack.....	12	12	6, 7	-0.16	Colibran.....	4.29	Manassa.....	0.05
Florida.....	75.2	- 0.6	Orange City.....	99	2	Breckenridge.....	38	11	6.96	+3.39	Middlesburg.....	17.13	Pensacola.....	1.74
Georgia.....	70.2	- 2.0	Mariana.....	99	21	Molino.....	38	11	4.32	+1.04	Screven.....	11.57	Tallahpoosa.....	0.86
Hawaii.....	72.0		Brunswick.....	99	20	Johnstown.....	29	10	5.01		Kakalau, Hawaii.....	20.73	Mana Pump, Kauai.....	0.14
Idaho.....	52.0	- 0.5	2 stations.....	92	2 dates	Clayton.....	50	8 dates	3.15	+0.94	Westlake.....	6.38	Hotsprings.....	0.81
Illinois.....	64.0	+ 0.8	Garnet.....	93	9	Soldier.....	14	18	2.70	-1.34	Dixon.....	7.24	Cairo.....	0.46
Indiana.....	63.7	+ 0.9	Cisne.....	95	24	La Harpe.....	26	7	2.29	-1.76	Rockville.....	5.36	Mount Vernou.....	0.57
Iowa.....	60.8	+ 0.1	Equality.....	95	18	Auburn.....	26	10	3.54	-0.70	Haulontown.....	10.72	Elliott.....	0.89
Kansas.....	65.0	+ 0.8	Logansport.....	98	24	Britt.....	24	7	2.62	-1.90	Yates Center.....	9.95	Norton.....	0.65
Kentucky.....	65.9	- 0.3	Odeboldt.....	95	11	Estherville.....	24	7	2.54	-1.51	Catlettsburg.....	5.10	Williamstown.....	0.63
Louisiana.....	73.9	- 0.3	Independence.....	99	31	Iowa Falls.....	24	7	2.10	-1.30	Covington.....	5.86	Cameron.....	T.
Maryland and Delaware.....	63.4	+ 0.2	Maysville.....	95	17	Lebanon.....	25	6	2.72	-0.95	Seaford, Del.....	4.86	Pocomoke City, Md.....	1.06
Michigan.....	53.9	- 0.3	Highbridge.....	95	18	Eubank, Shelby City.....	31	8	2.89	-0.52	Isle Royale.....	6.74	Petoskey.....	0.75
Minnesota.....	53.7	- 1.7				Owenton, Williams-town.....	31	9	5.58	+2.17	Minneapolis.....	10.90	Worthington.....	1.04
Mississippi.....	70.4	- 2.1	Ruston.....	100	27	Liberty Hill.....	40	10	4.92	+1.29	Quitman.....	10.34	Bay Saint Louis.....	0.45
Missouri.....	66.3	+ 1.0	Milford, Del.....	97	18	Robeline.....	40	10	2.16	-2.90	Dean.....	7.85	Cape Girardeau.....	0.31
Montana.....	50.2	- 2.0	Marquette.....	91	17	Deer Park, Md.....	22	8	4.06	+1.92	St. Pauls.....	9.27	Troy.....	1.88
Nebraska.....	60.2	+ 0.7	Halstad.....	93	11	Wetmore.....	12	20	2.78	-0.90	Blair.....	7.07	Mason City.....	0.33
Nevada.....	53.1	- 1.3	Moorhead.....	93	11	Hallock.....	14	6	1.38	+0.32	Palmetto.....	3.44	Logan.....	T.
New England*.....	55.1	- 0.4	Pearlington.....	98	18	Ripley.....	34	10	4.96	+1.35	Nashua, N. H.....	7.22	Van Buren, Me.....	1.90
New Jersey.....	61.0	+ 0.6	Caruthersville.....	98	30	Bethany.....	27	9	4.21	+0.38	Canton.....	6.28	Clayton.....	2.37
New Mexico.....	60.5	- 1.1	Billings.....	96	10	Fallon.....	9	6	0.50	-0.48	Los Alamos.....	1.87	Cambray.....	0.00
New York.....	55.8	- 0.5	Lynch.....	97	11, 13	Agate.....	20	6	3.99	+0.60	Easton.....	9.18	Palma.....	0.00
North Carolina.....	66.4	- 1.1	Logan.....	98	8	Squaw Valley.....	14	17	3.01	-1.42	Buckspring.....	11.95	Paul Smiths.....	0.89
North Dakota.....	50.8	- 2.3	Plymouth, N. H.....	96	18	Fort Fairfield, Me.....	21	3	4.63	+2.25	Fullerton.....	8.08	Hatteras.....	0.55
Ohio.....	61.3	+ 0.1	Norfolk, Mass.....	96	18	Layton.....	24	11	2.17	-1.46	Frankfort.....	3.58	Edmore.....	2.35
Oklahoma and Indian Territories.....	63.8	- 0.1	Belvidere.....	94	18	Luna.....	18	1	3.22	-2.43	South McAllister, Ind. T.....	7.46	Tiffin.....	0.88
Oregon.....	53.8	- 0.6	Carlisle.....	101	28	Indian Lake.....	20	21	3.33	+0.70	Gold Beach.....	11.07	Tift Gibson, Ind. T.....	0.20
Pennsylvania.....	60.0	+ 0.2	San Marcial.....	101	28	Pink Beds.....	23	10	3.23	-1.01	Emporium.....	5.59	Hyndman.....	0.93
Porto Rico.....	77.1		Lake George.....	95	18	Milton.....	11	6	4.69		Afasco.....	11.17	Coamo.....	0.23
South Carolina.....	70.7	- 1.5	Dunseith.....	99	11	Bellefontaine.....	24	10						
South Dakota.....	56.6	- 0.4	Amesville.....	94	17	Jefferson, Okla.....	32	9						
Tennessee.....	66.6	- 0.7	Arapaho, Okla.....	98	29	Bend.....	21	16						
Texas.....	73.3	- 0.2				Dushore.....	23	11						
Utah.....	55.1	- 2.2	Blalock.....	97	9	Adjuntas.....	51	7						
Virginia.....	64.2	- 0.5	Marion.....	99	27									
Washington.....	55.2	0.0	Caguas.....	98	25-28									
West Virginia.....	62.7	0.0	Manati.....	58	22-26									
Wisconsin.....	54.9	- 1.6												
Wyoming.....	48.4	- 0.6												

* Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

† Cooperative station.

‡ Same reading occurred at other stations.